

**CLAIMS**

1. Bioactive silicon (20, 520) characterized in that the silicon is at least partly crystalline.
2. Bioactive silicon according to Claim 1, characterized in that when immersed in a simulated body fluid solution held at a physiological temperature the silicon induces the deposition of a mineral deposit (54, C) thereon.
3. Bioactive silicon according to Claim 2, characterized in that the mineral deposit is apatite.
4. Bioactive silicon according to Claim 3, characterized in that the apatite is continuous over at least an area of  $100 \mu\text{m}^2$ .
5. Bioactive silicon according to Claim 1, characterized in that the silicon (20) is at least partially porous with a porosity greater than 4% and less than 70%.
6. Bioactive silicon according to Claim 5, characterized in that the porous silicon is microporous.
7. Bioactive silicon according to Claim 5, characterized in that the porous silicon is mesoporous.
8. Bioactive silicon according to Claim 5, characterized in that the porous silicon is visibly luminescent.
9. Bioactive silicon according to Claim 1 or Claim 5, characterized in that the silicon is impregnated with at least one species taken from a list of calcium, sodium and phosphorus.
10. Bioactive silicon according to Claim 1, characterized in that the silicon is polycrystalline silicon (520).

11. A bioactive silicon structure (10, 300, 500) characterized in that the silicon is at least partly crystalline.
12. A bioactive silicon structure according to Claim 11, characterized in that the structure comprises a porous silicon region (20) having a porosity greater than 4% and less than 70%.
13. A bioactive silicon structure according to Claim 12, characterized in that the porous silicon is microporous.
14. A bioactive silicon structure according to Claim 12, characterized in that the porous silicon is mesoporous.
15. A bioactive silicon structure according to Claim 12, characterized in that the structure also includes macropores.
16. A bioactive silicon structure according to Claim 11 or Claim 12, characterized in that the silicon is impregnated with at least one species taken from a list of calcium, sodium and phosphorus.
17. A bioactive silicon structure according to Claim 16 wherein the porous silicon is impregnated with calcium at a concentration greater than  $10^{21} \text{ cm}^{-3}$ .
18. A bioactive silicon structure according to Claim 11, characterized in that the structure includes resorbable silicon material.
19. A bioactive silicon structure according to Claim 11, characterized in that the structure comprises a region of polycrystalline silicon (520).
20. An electronic device (300, 500) for operation within a living human or animal body, characterized in that the device includes bioactive silicon (20, 520).

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21. An electronic device according to Claim 20, characterized in that the bioactive silicon comprises at least partially porous silicon having a porosity greater than 4% and less than 70%.
22. An electronic device according to Claim 21, characterized in that the porous silicon contains macropores for enhancing vascular tissue ingrowth.
23. An electronic device according to Claim 21, characterized in that the porous silicon extends at least partially over an outer surface of the device.
24. An electronic device according to any one of Claims 20 to 23, characterized in that the device is a sensor device.
25. An electronic device according to Claim 20, characterized in that the bioactive silicon is polycrystalline silicon.
26. A method of making silicon bioactive, the method comprising making at least part of the silicon porous.
27. A method according to Claim 26, characterized in that the method includes the impregnation of the porous silicon with calcium.
28. A method of fabricating bioactive silicon, characterized in that the method comprises the step of depositing a layer of polycrystalline silicon.
29. The use of bioactive silicon for the construction of a device (300, 500) for use in a living human or animal body characterized in that the silicon is at least partly crystalline.
30. Bioactive silicon (20, 520) for use in a method of treatment of the human or animal body.

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31. Bioactive silicon (20, 520) incorporated in a device (300, 500) suitable for use in a living human or animal body characterized in that the silicon is at least partly crystalline.
32. Biocompatible silicon (20, 520) characterized in that the silicon is at least partly crystalline.
33. Biocompatible silicon according to Claim 32, characterized in that when immersed in a simulated body fluid solution held at a physiological temperature the silicon induces the deposition of a mineral deposit thereon.
34. Resorbable silicon.
35. Resorbable silicon according to Claim 34, characterized in that the resorbable silicon comprises a region of porous silicon such that when immersed in a simulated body fluid solution the porous silicon dissolves over a period of time.
36. A method of accelerating or retarding the rate of deposition of a mineral deposit on silicon in a physiological electrolyte wherein the method comprises the application of an electrical bias to the silicon.
37. A method according to Claim 36, characterized in that the silicon is porous silicon.
38. Bioactive material (20) characterised in that the bioactivity of the material is controllable by the application of an electrical bias to the material.
39. Bioactive electrically conductive material (20, 520).
40. A composite structure (10, 300, 500) comprising bioactive silicon region (20, 520) and a mineral deposit thereon characterized in that the silicon region comprises silicon which is at least partly crystalline.

41. A composite structure according to Claim 40, characterized in that the mineral deposit is apatite.
42. A composite structure according to Claim 40 or Claim 41, characterized in that the bioactive silicon region is porous silicon (20).
43. A composite structure according to Claim 40 or Claim 41, characterized in that the bioactive silicon is polycrystalline silicon (520).
44. A method of fabricating a biosensor, characterized in that the method includes the step of forming a composite structure of bioactive silicon and a mineral deposit thereon.
45. A biosensor for testing the pharmacological activity of compounds including a silicon substrate, characterized in that at least part of the silicon substrate is comprised of bioactive silicon.

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